Supporting Information

Rabeling *et al.* 10.1073/pnas.0806187105

SI Materials and Methods

Taxon and Gene Sampling. We extracted DNA from the right front leg, which we removed from the holotype, using a QIAGEN DNA Micro Kit following the instructions for small tissue samples. Two nuclear ribosomal genes and one single-copy nuclear gene were amplified using conventional PCR methods and sequenced. We obtained a total of 4926-bp-aligned (4197-bp-unaligned) sequence data: 1904 bp (1852 bp unaligned) for 18S; 2505 bp (1828 bp unaligned) for 28S; and 517 bp (517 bp unaligned) for elongation factor 1 F2. Discrepancies between aligned and unaligned numbers of base pairs are because of insertions in sequences of other taxa. We failed to sequence additional genes from the limited amount of extract. Primers are reported elsewhere (1, 2). The obtained DNA sequences were aligned with the data matrix provided by Brady *et al.* (1). DNA sequences are deposited at GenBank (www.ncbi.nlm.nih.gov/) as accessions EU913472–EU913474.

Phylogenetic Inference. The phylogenetic position of *Martialis* was estimated using both maximum likelihood (ML) and Bayesian approaches. Ambiguously aligned sites were excluded from both Bayesian and ML analyses. After excluding ambiguously aligned sites, the data set contained 1,048 variable sites, of which 765 were parsimony-informative characters.

Replicate, heuristic maximum likelihood (ML) searches in Garli v0.951 (3) were conducted until either the best-scoring topology was found twice or 50 replicate searches were performed. Generally, the two best topologies after 50 searches were topologically quite similar, if not identical. To ensure that ML scores were maximized, topologies resulting from all Garli searches were rescored in PAUP* (4). Analysis parameters were varied across Garli searches, although no set of parameters was found that consistently improved the search. Bootstrapping analyses used default analysis parameters with 500 bootstrap replicates.

Bayesian analyses were conducted with MrBayes v3.2 (5). (This is an unreleased version of MrBayes. The source code was downloaded from the current version system on Oct. 10, 2007). Characters were divided into four partitions: (*i*) the first and second codon positions of EF1αF2, (*ii*) the third codon positions of EF1αF2, (*iii*) the 18s rRNA gene, and (*iv*) the 28S rRNA gene. Parameters of the model of sequence evolution (i.e., relative rate matrix, base frequencies, transition/transversion ratio, proportion of invariant sites, and rate variation shape parameter) were unlinked across partitions, although topology, branch lengths, and rate multipliers remained linked. Model parameterization was chosen to reflect the models used by Brady *et al.* (1) and facilitate comparison to their results. Metropolis coupling was used with eight chains per analysis and a temperature increment of 0.05. Four independent replicates were run for each analysis. The state of the cold chain was recorded every 200 generations. Convergence was assessed using methods described in Brown and Lemmon (6) and implemented in the Java program, MrConverge v1b2 (A.R. Lemmon; available from http://www.evotutor.org/MrConverge). Briefly, these methods estimate the point of stationarity in likelihood scores, and the point at which the overall discordance in bipartition posterior probabilities is minimized. The latter of these two points in the chain is set as the burn-in. Convergence is reached when the widest 95% confidence interval for posterior probability across all bipartitions falls below a width of 0.1. At this point, the true bipartition posterior probability for all bipartitions lies within $\pm$0.05 of the estimated posterior probability.

Phyutility v2.2 (7) and FigTree v1.1.2 (8) were used to reroot trees, calculate consensus topologies, and assist in the creation of phylogenetic figures.

Topological Hypothesis Testing. Hypothesized rootings were compared using posterior probabilities, Bayes factors (BF; 9–12) and the Shimodaira–Hasegawa test (SH) (13, 14). ML and Bayesian analyses were used to estimate phylogenies under constraints corresponding to different rootings (Fig. 4), with the same analysis conditions as given above.

Marginal likelihoods from Bayesian analyses were estimated as the harmonic mean of the sampled likelihoods (10, 11, 15). The harmonic mean estimator has been found to perform well for phylogenetic applications (11). Bayes factors in favor of the *alternative* rooting were calculated as the ratio of marginal likelihoods, with the marginal likelihood of the alternative rooting in the numerator. The test statistic, 2ln(BF), was calculated with values less than -10 corresponding to strong support *against* the alternative (in favor of the maximum posterior probability rooting).

The SH test (13) was performed in PAUP* 4.0b10 (4) with RELL approximations and 1,000 bootstrap replicates, using the ML topology from the constrained searches under each of seven hypothesized rootings (Fig. 4). The SH test is a highly conservative test of topology (16).

Model Adequacy Test. The adequacy of the model of sequence evolution used in the Bayesian analyses was assessed using posterior predictive simulation (17) with a multinomial likelihood test statistic, as implemented in the program PuMA v0.903 (18). One percent of posterior samples were used to simulate predictive data sets. The test statistic values of these simulated data sets defined the null distribution to which the test statistic value of the empirical data set was compared (supporting information (SI) Fig. S3).

We note that all phylogenetic estimates and topological hypothesis tests are contingent on the model of sequence evolution used in the analysis (16) although model adequacy is rarely evaluated in phylogenetic studies. Bayesian model adequacy tests reject the adequacy of the partitioned model used in our analyses ($P < 0.001$; Fig. S3). However, the magnitude and direction of any error induced by an inadequate model is unknown, thus we maintain that our results are still best possible estimates at this time. We do anticipate that future developments in phylogenetic methodology will produce adequate models of sequence evolution and our results and hypothesis should then be revisited.

Morphometric Measurements. The only specimen available was examined using a Leica MZ16 stereo-microscope at magnifications of up 184×. Measurements were completed at 115× using a calibrated ocular micrometer. All metric measurements were recorded to the nearest 0.001 mm and rounded to two decimal places for presentation. Measurements are given in millimeters. Morphological terminology follows Bolton (19) and Dlussky (20). Anatomical abbreviations and definitions of measurements are shown in Table S1.

Microscope Photography. Photomicrographs were taken using a JVC KY-F70 digital camera mounted on a Leica Z6 APO dissecting scope. Composite images were assembled from 20 sequential photographs with Syncroscopy AutoMontage (v 5.0) software (21).

1. Brady SG, Fisher BL, Schultz TR, Ward PS (2006) Evaluating alternative hypotheses for the early evolution and diversification of ants. *Proc Natl Acad Sci USA* 103:18172–18177.
2. Ward PS, Downie DA (2005) The ant subfamily Pseudomyrmecinae (Hymenoptera: Formicidae): Phylogeny and evolution of big-eyed arboreal ants. *Syst Entomol* 30:310–335.
3. Zwickl DJ (2006) Genetic algorithm approaches for the phylogenetic analysis of large biological sequence datasets under the maximum likelihood criterion. PhD dissertation (Univer of Texas, Austin).
4. Swofford DL (2002) *PAUP*, Phylogenetic Analysis Using Parsimony (*and Other Methods) v4.0b10* (Sinauer Associates, Sunderland, MA).
5. Huelsenbeck JP, Ronquist F (2001) MRBAYES: Bayesian inference of phylogenetic trees. *Bioinformatics* 17:754–755.
6. Brown JM, Lemmon AR (2007) The importance of data partitioning and the utility of Bayes factors in Bayesian phylogenetics. *Syst Biol* 56:643–655.
7. Smith SA, Dunn CW (2008) Phyutility: A phyloinformatics tool for trees, alignments, and molecular data. *Bioinformatics* 24: 715–716. Available at http://code.google.com/p/phyutility.
8. Rambaut A (2007) FigTree, a graphical viewer of phylogenetic trees. Available at http://tree.bio.ed.ac.uk/software/figtree/.
9. Kass RE, Raftery AE (1995) Bayes factors. *J Am Stat Assoc* 90:773–795.
10. Nylander JAA, Ronquist F, Huelsenbeck JP, Nieves-Aldrey JL (2004) Bayesian phylogenetic analysis of combined data. *Syst Biol* 53:47–67.
11. Brown JM, Lemmon AR (2007) The importance of data partitioning and the utility of Bayes factors in Bayesian phylogenetics. *Syst Biol* 56:643–655.
12. Lavine M, Schervish MJ (1999) Bayes factors: What they are and what they are not. *Am Statist* 53:119–122.
13. Shimodaira H, Hasegawa M (1999) Multiple comparisons of log-likelihoods with applications to phylogenetic inference. *Mol Biol Evol* 16:1114–1116.
14. Goldman N, Anderson JP, Rodrigo AG (2000) Likelihood-based tests of topologies in phylogenetics. *Syst Biol* 49:652–670.
15. Brandley MC, Schmitz A, Reeder TW (2005) Partitioned Bayesian analyses, partition choice, and the phylogenetic relationships of scincid lizards. *Syst Biol* 54:373–390.
16. Buckley TR (2002) Model misspecification and probabilistic tests of topology: Evidence from empirical data sets. *Syst Biol* 53:509–523.
17. Bollback JP (2002) Bayesian model adequacy and choice in phylogenetics. *Mol Biol Evol* 19:1171–1180.
18. Brown JM, ElDabaje R (2008) PuMA: Bayesian analysis of partitioned (and unpartitioned) model adequacy. Available at http://code.google.com/p/phylo-puma. Accessed March 1, 2008.
19. Bolton B (1994) *Identification Guide to the Ant Genera of the World* (Harvard Univ Press, Cambridge, MA).
20. Dlussky GM (1983) A new family of upper Cretaceous Hymenoptera: An intermediate link between the ants and scolioids. *Paleontol Zh* (1983)3:65–78 (translated from Russian; English translation in *Paleontol J* 17: 63–76).
21. Riedel A (2005) Digital imaging of beetles (Coleoptera) and other three-dimensional insects. *Digital Imaging of Biological Type Specimens. A Manual of Best Practice. Results from a Study of the European Network for Biodiversity Information*, Häuser *et al.* (*Staatl.* Museum für Naturkunde, Stuttgart). pp 222–250.

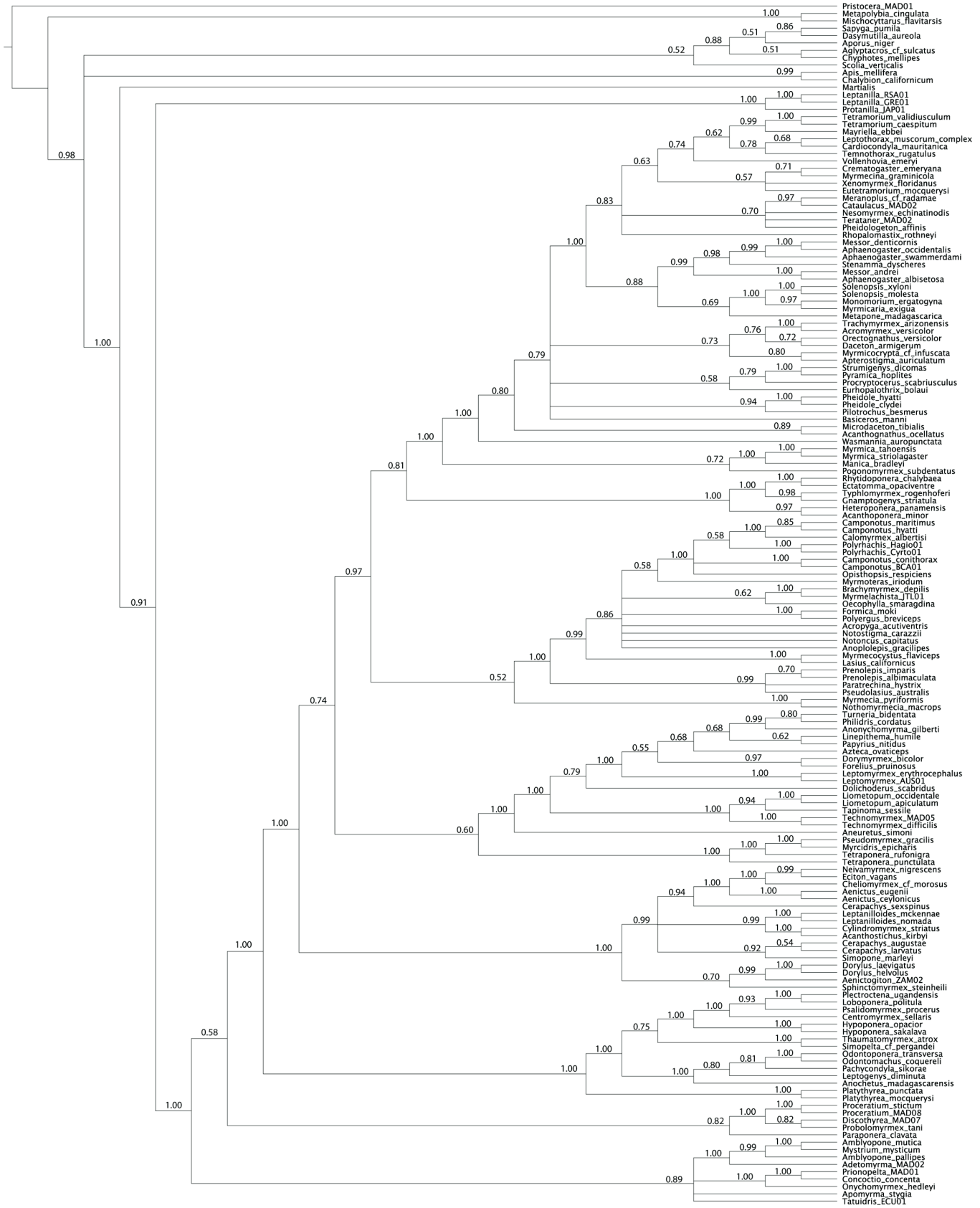

Fig. S1. Results from Bayesian analyses. (*A*) Bayesian tree from analysis of the full data set, (*B*) with Leptanillinae excluded from analysis, (*C*) with Leptanillinae and outgroups excluded, (*D*) with *Martialis* excluded, (*E*) with *Martialis* and outgroups excluded, (*F*) with only outgroups excluded.

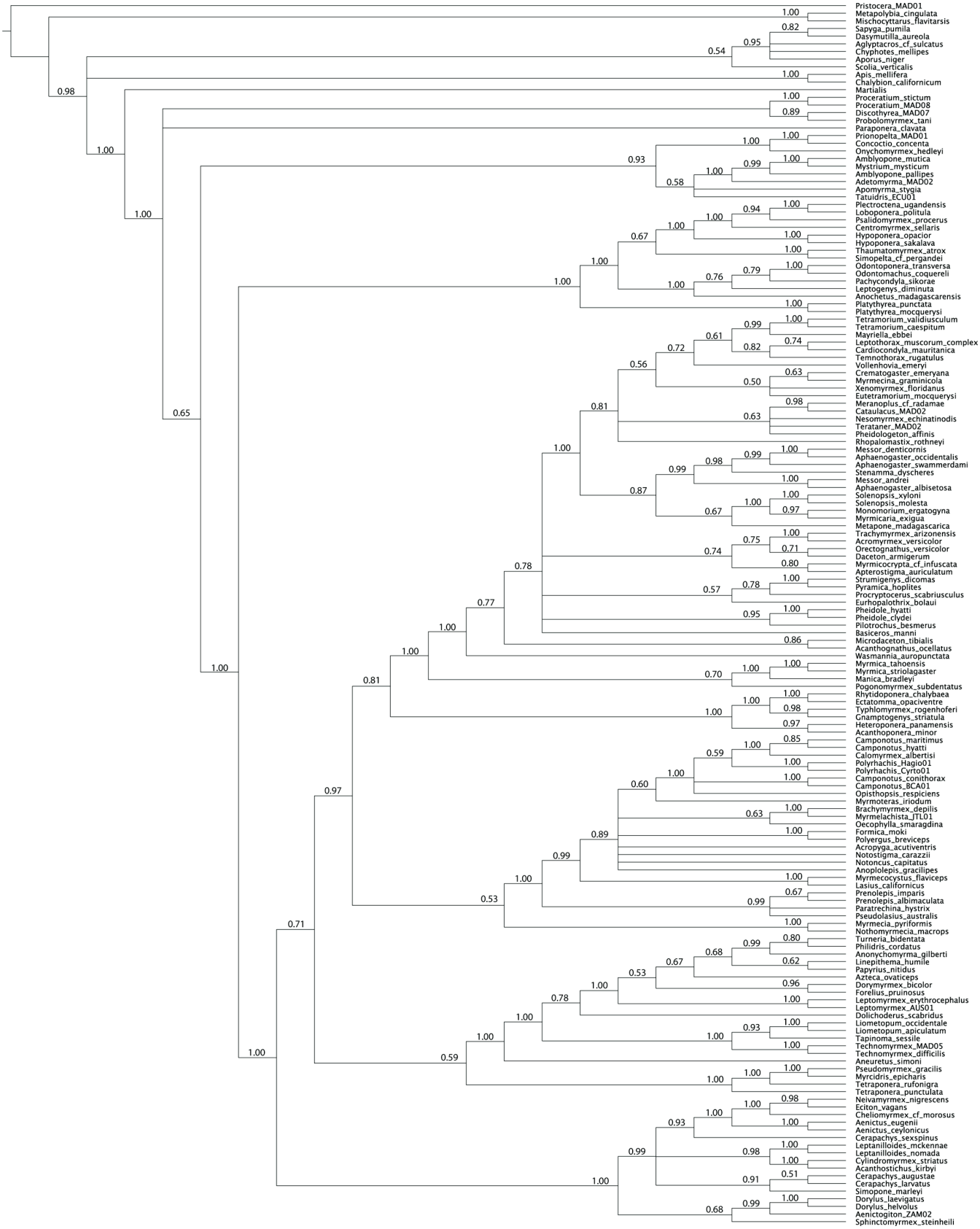
Pristocera_MAD01
Metapolybia_cingulata
Mischocyttarus_flavitarsis
Sapyga_pumila
Dasymutilla_aureola
Aglyptacros_cf_sulcatus
Chyphotes_mellipes
Aporus_niger
Scolia_verticalis
Apis_mellifera
Chalybion_californicum
Martialis
Proceratium_stictum
Proceratium_MAD08
Discothyrea_MAD07
Probolomyrmex_tani
Paraponera_clavata
Prionopelta_MAD01
Concoctio_concenta
Onychomyrmex_hedleyi
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Adetomyrma_MAD02
Apomyrma_stygia
Tatuidris_ECU01
Plectroctena_ugandensis
Loboponera_politula
Psalidomyrmex_procerus
Centromyrmex_sellaris
Hypoponera_opacior
Hypoponera_sakalava
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Odontoponera_transversa
Odontomachus_coquereli
Pachycondyla_sikorae
Leptogenys_diminuta
Anochetus_madagascarensis
Platythyrea_punctata
Platythyrea_mocquerysi
Tetramorium_validiusculum
Tetramorium_caespitum
Mayriella_ebbei
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Temnothorax_rugatulus
Vollenhovia_emeryi
Crematogaster_emeryana
Myrmecina_graminicola
Xenomyrmex_floridanus
Eutetramorium_mocquerysi
Meranoplus_cf_radamae
Cataulacus_MAD02
Nesomyrmex_echinatinodis
Terataner_MAD02
Pheidologeton_affinis
Rhopalomastix_rothneyi
Messor_denticornis
Aphaenogaster_occidentalis
Aphaenogaster_swammerdami
Stenamma_dyscheres
Messor_andrei
Aphaenogaster_albisetosa
Solenopsis_xyloni
Solenopsis_molesta
Monomorium_ergatogyna
Myrmicaria_exigua
Metapone_madagascarica
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Orectognathus_versicolor
Daceton_armigerum
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Strumigenys_dicomas
Pyramica_hoplites
Procryptocerus_scabriusculus
Eurhopalothrix_bolaui
Pheidole_hyatti
Pheidole_clydei
Pilotrochus_besmerus
Basiceros_manni
Microdaceton_tibialis
Acanthognathus_ocellatus
Wasmannia_auropunctata
Myrmica_tahoensis
Myrmica_striolagaster
Manica_bradleyi
Pogonomyrmex_subdentatus
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Heteroponera_panamensis
Acanthoponera_minor
Camponotus_maritimus
Camponotus_hyatti
Calomyrmex_albertisi
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Camponotus_conithorax
Camponotus_BCA01
Opisthopsis_respiciens
Myrmoteras_iriodum
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Formica_moki
Polyergus_breviceps
Acropyga_acutiventris
Notostigma_carazzii
Notoncus_capitatus
Anoplolepis_gracilipes
Myrmecocystus_flaviceps
Lasius_californicus
Prenolepis_imparis
Prenolepis_albimaculata
Paratrechina_hystrix
Pseudolasius_australis
Myrmecia_pyriformis
Nothomyrmecia_macrops
Turneria_bidentata
Philidris_cordatus
Anonychomyrma_gilberti
Linepithema_humile
Papyrius_nitidus
Azteca_ovaticeps
Dorymyrmex_bicolor
Forelius_pruinosus
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
Dolichoderus_scabridus
Liometopum_occidentale
Liometopum_apiculatum
Tapinoma_sessile
Technomyrmex_MAD05
Technomyrmex_difficilis
Aneuretus_simoni
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_rufonigra
Tetraponera_punctulata
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Aenictus_eugenii
Aenictus_ceylonicus
Cerapachys_sexspinus
Leptanilloides_mckennae
Leptanilloides_nomada
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Cerapachys_augustae
Cerapachys_larvatus
Simopone_marleyi
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili

Fig. S1B.

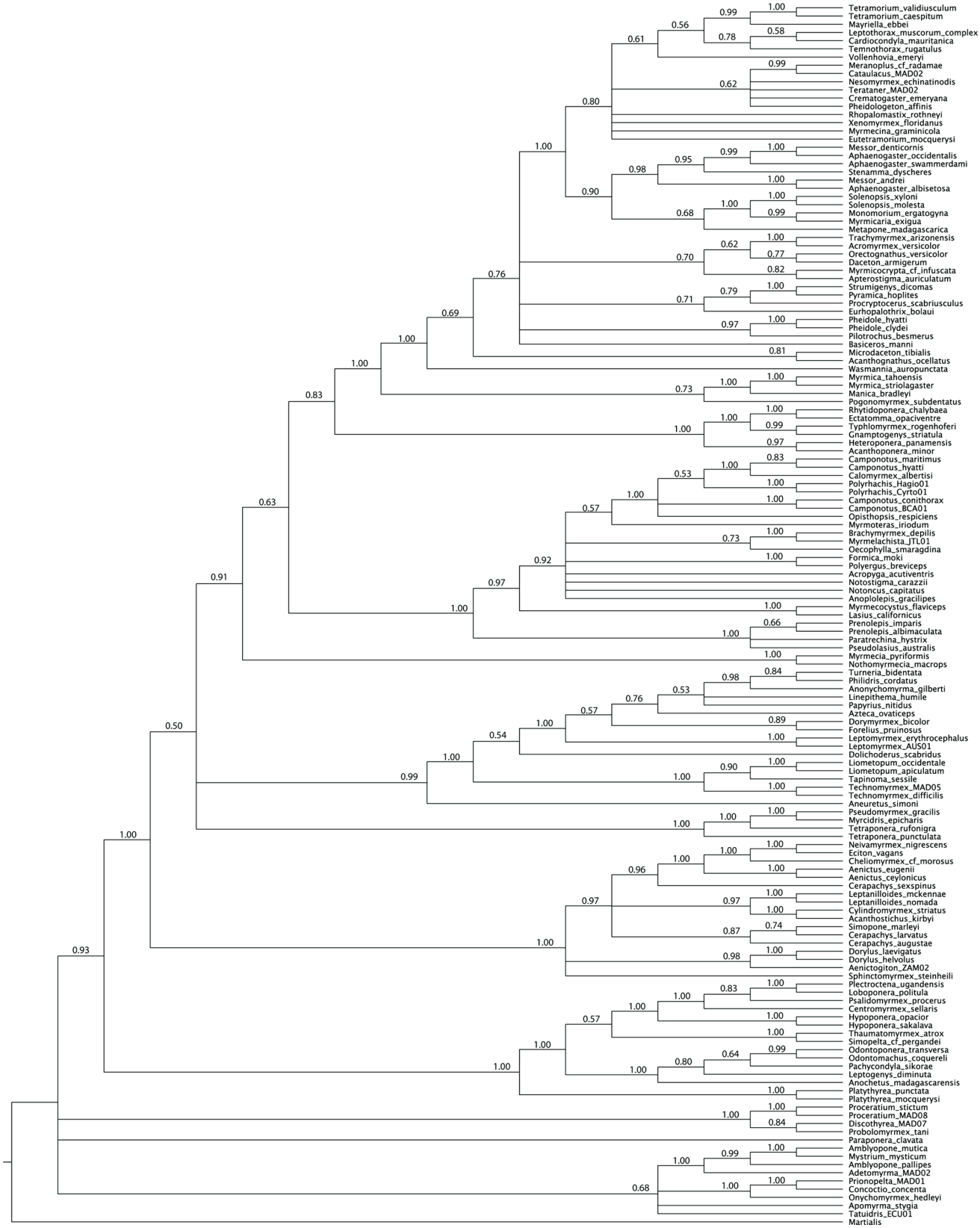
Tetramorium_validiusculum
Tetramorium_caespitum
Mayriella_ebbei
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Temnothorax_rugatulus
Vollenhovia_emeryi
Meranoplus_cf_radamae
Cataulacus_MAD02
Nesomyrmex_echinatinodis
Terataner_MAD02
Crematogaster_emeryana
Pheidologeton_affinis
Rhopalomastix_rothneyi
Xenomyrmex_floridanus
Myrmecina_graminicola
Eutetramorium_mocquerysi
Messor_denticornis
Aphaenogaster_occidentalis
Aphaenogaster_swammerdami
Stenamma_dyscheres
Messor_andrei
Aphaenogaster_albisetosa
Solenopsis_xyloni
Solenopsis_molesta
Monomorium_ergatogyna
Myrmicaria_exigua
Metapone_madagascarica
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Orectognathus_versicolor
Daceton_armigerum
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Strumigenys_dicomas
Pyramica_hoplites
Procryptocerus_scabriusculus
Eurhopalothrix_bolaui
Pheidole_hyatti
Pheidole_clydei
Pilotrochus_besmerus
Basiceros_manni
Microdaceton_tibialis
Acanthognathus_ocellatus
Wasmannia_auropunctata
Myrmica_tahoensis
Myrmica_striolagaster
Manica_bradleyi
Pogonomyrmex_subdentatus
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Heteroponera_panamensis
Acanthoponera_minor
Camponotus_maritimus
Camponotus_hyatti
Calomyrmex_albertisi
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Camponotus_conithorax
Camponotus_BCA01
Opisthopsis_respiciens
Myrmoteras_iriodum
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Formica_moki
Polyergus_breviceps
Acropyga_acutiventris
Notostigma_carazzii
Notoncus_capitatus
Anoplolepis_gracilipes
Myrmecocystus_flaviceps
Lasius_californicus
Prenolepis_imparis
Prenolepis_albimaculata
Paratrechina_hystrix
Pseudolasius_australis
Myrmecia_pyriformis
Nothomyrmecia_macrops
Turneria_bidentata
Philidris_cordatus
Anonychomyrma_gilberti
Linepithema_humile
Papyrius_nitidus
Azteca_ovaticeps
Dorymyrmex_bicolor
Forelius_pruinosus
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
Dolichoderus_scabridus
Liometopum_occidentale
Liometopum_apiculatum
Tapinoma_sessile
Technomyrmex_MAD05
Technomyrmex_difficilis
Aneuretus_simoni
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_rufonigra
Tetraponera_punctulata
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Aenictus_eugenii
Aenictus_ceylonicus
Cerapachys_sexspinus
Leptanilloides_mckennae
Leptanilloides_nomada
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Simopone_marleyi
Cerapachys_larvatus
Cerapachys_augustae
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili
Plectroctena_ugandensis
Loboponera_politula
Psalidomyrmex_procerus
Centromyrmex_sellaris
Hypoponera_opacior
Hypoponera_sakalava
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Odontoponera_transversa
Odontomachus_coquereli
Pachycondyla_sikorae
Leptogenys_diminuta
Anochetus_madagascarensis
Platythyrea_punctata
Platythyrea_mocquerysi
Proceratium_stictum
Proceratium_MAD08
Discothyrea_MAD07
Probolomyrmex_tani
Paraponera_clavata
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Adetomyrma_MAD02
Prionopelta_MAD01
Concoctio_concenta
Onychomyrmex_hedleyi
Apomyrma_stygia
Tatuidris_ECU01
Martialis

Fig. S1C.

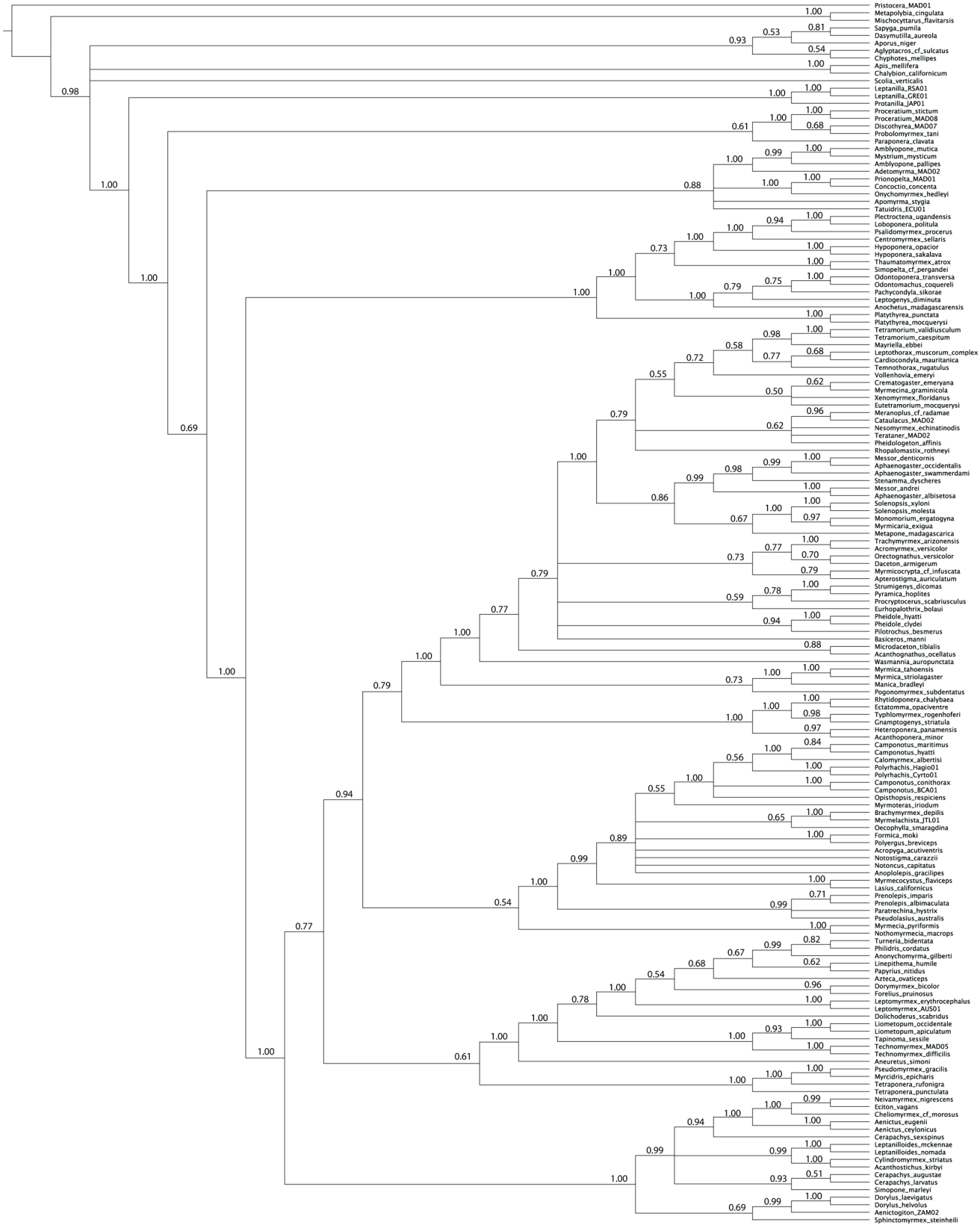
Pristocera_MAD01
Metapolybia_cingulata
Mischocyttarus_flavitarsis
Sapyga_pumila
Dasymutilla_aureola
Aporus_niger
Aglyptacros_cf_sulcatus
Chyphotes_mellipes
Apis_mellifera
Chalybion_californicum
Scolia_verticalis
Leptanilla_RSA01
Leptanilla_GRE01
Protanilla_JAP01
Proceratium_stictum
Proceratium_MAD08
Discothyrea_MAD07
Probolomyrmex_tani
Paraponera_clavata
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Adetomyrma_MAD02
Prionopelta_MAD01
Concoctio_concenta
Onychomyrmex_hedleyi
Apomyrma_stygia
Tatuidris_ECU01
Plectroctena_ugandensis
Loboponera_politula
Psalidomyrmex_procerus
Centromyrmex_sellaris
Hypoponera_opacior
Hypoponera_sakalava
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Odontoponera_transversa
Odontomachus_coquereli
Pachycondyla_sikorae
Leptogenys_diminuta
Anochetus_madagascarensis
Platythyrea_punctata
Platythyrea_mocquerysi
Tetramorium_validiusculum
Tetramorium_caespitum
Mayriella_ebbei
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Temnothorax_rugatulus
Vollenhovia_emeryi
Crematogaster_emeryana
Myrmecina_graminicola
Xenomyrmex_floridanus
Eutetramorium_mocquerysi
Meranoplus_cf_radamae
Cataulacus_MAD02
Nesomyrmex_echinatinodis
Teratanere_MAD02
Pheidologeton_affinis
Rhopalomastix_rothneyi
Messor_denticornis
Aphaenogaster_occidentalis
Aphaenogaster_swammerdami
Stenamma_dyscheres
Messor_andrei
Aphaenogaster_albisetosa
Solenopsis_xyloni
Solenopsis_molesta
Monomorium_ergatogyna
Myrmicaria_exigua
Metapone_madagascarica
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Orectognathus_versicolor
Daceton_armigerum
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Strumigenys_dicomas
Pyramica_hoplites
Procryptocerus_scabriusculus
Eurhopalothrix_bolaui
Pheidole_hyatti
Pheidole_clydei
Pilotrochus_besmerus
Basiceros_manni
Microdaceton_tibialis
Acanthognathus_ocellatus
Wasmannia_auropunctata
Myrmica_tahoensis
Myrmica_striolagaster
Manica_bradleyi
Pogonomyrmex_subdentatus
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Heteroponera_panamensis
Acanthoponera_minor
Camponotus_maritimus
Camponotus_hyatti
Calomyrmex_albertisi
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Camponotus_conithorax
Camponotus_BCA01
Opisthopsis_respiciens
Myrmoteras_iriodum
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Formica_moki
Polyergus_breviceps
Acropyga_acutiventris
Notostigma_carazzii
Notoncus_capitatus
Anoplolepis_gracilipes
Myrmecocystus_flaviceps
Lasius_californicus
Prenolepis_imparis
Prenolepis_albimaculata
Paratrechina_hystrix
Pseudolasius_australis
Myrmecia_pyriformis
Nothomyrmecia_macrops
Turneria_bidentata
Philidris_cordatus
Anonychomyrma_gilberti
Linepithema_humile
Papyrius_nitidus
Azteca_ovaticeps
Dorymyrmex_bicolor
Forelius_pruinosus
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
Dolichoderus_scabridus
Liometopum_occidentale
Liometopum_apiculatum
Tapinoma_sessile
Technomyrmex_MAD05
Technomyrmex_difficilis
Aneuretus_simoni
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_rufonigra
Tetraponera_punctulata
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Aenictus_eugenii
Aenictus_ceylonicus
Cerapachys_sexspinus
Leptanilloides_mckennae
Leptanilloides_nomada
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Cerapachys_augustae
Cerapachys_larvatus
Simopone_marleyi
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili

Fig. S1D.

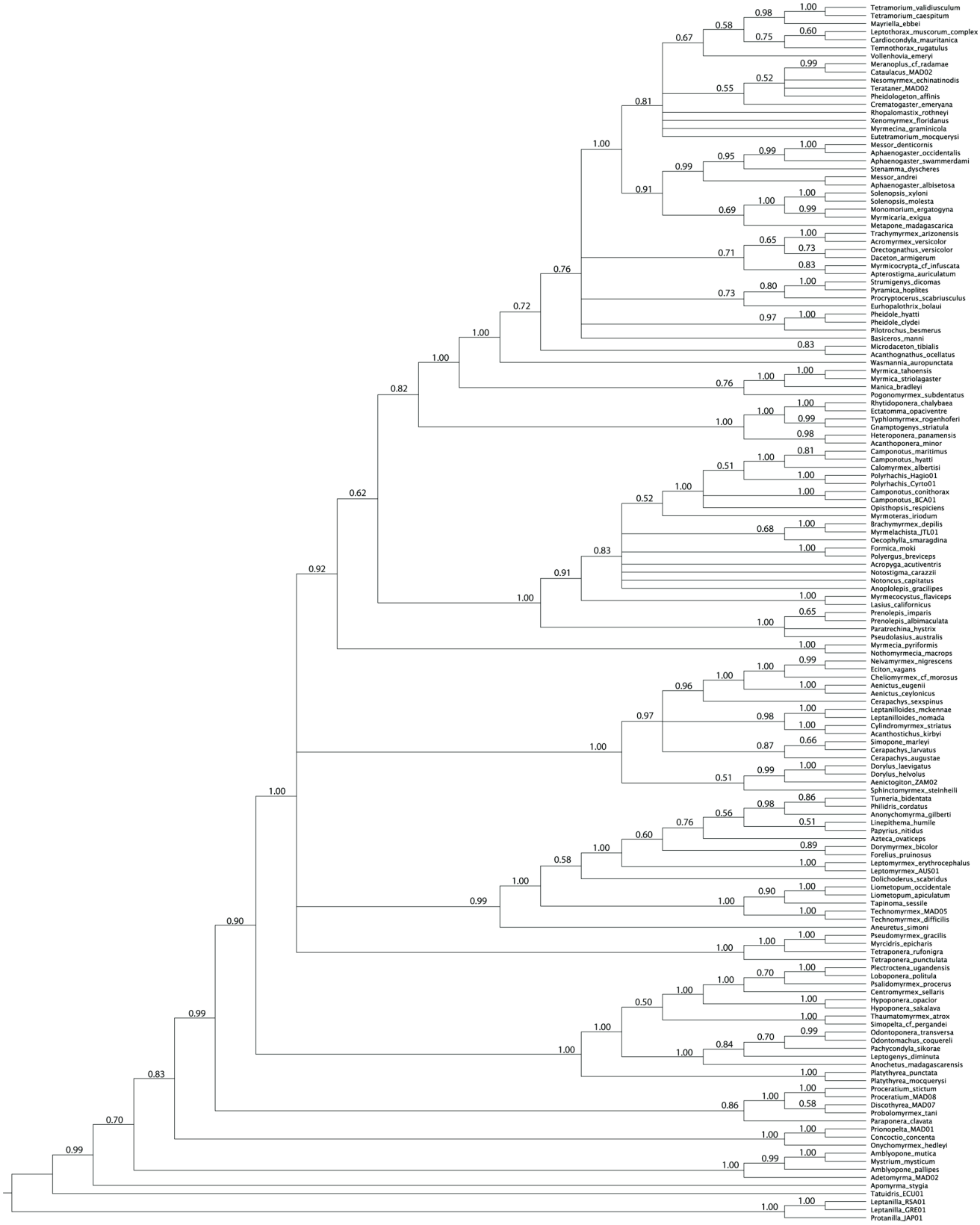
Tetramorium_validiusculum
Tetramorium_caespitum
Mayriella_ebbei
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Temnothorax_rugatulus
Vollenhovia_emeryi
Meranoplus_cf_radamae
Cataulacus_MAD02
Nesomyrmex_echinatinodis
Terataner_MAD02
Pheidologeton_affinis
Crematogaster_emeryana
Rhopalomastix_rothneyi
Xenomyrmex_floridanus
Myrmecina_graminicola
Eutetramorium_mocquerysi
Messor_denticornis
Aphaenogaster_occidentalis
Aphaenogaster_swammerdami
Stenamma_dyscheres
Messor_andrei
Aphaenogaster_albisetosa
Solenopsis_xyloni
Solenopsis_molesta
Monomorium_ergatogyna
Myrmicaria_exigua
Metapone_madagascarica
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Orectognathus_versicolor
Daceton_armigerum
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Strumigenys_dicomas
Pyramica_hoplites
Procryptocerus_scabriusculus
Eurhopalothrix_bolaui
Pheidole_hyatti
Pheidole_clydei
Pilotrochus_besmerus
Basiceros_manni
Microdaceton_tibialis
Acanthognathus_ocellatus
Wasmannia_auropunctata
Myrmica_tahoensis
Myrmica_striolagaster
Manica_bradleyi
Pogonomyrmex_subdentatus
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Heteroponera_panamensis
Acanthoponera_minor
Camponotus_maritimus
Camponotus_hyatti
Calomyrmex_albertisi
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Camponotus_conithorax
Camponotus_BCA01
Opisthopsis_respiciens
Myrmoteras_iriodum
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Formica_moki
Polyergus_breviceps
Acropyga_acutiventris
Notostigma_carazzii
Notoncus_capitatus
Anoplolepis_gracilipes
Myrmecocystus_flaviceps
Lasius_californicus
Prenolepis_imparis
Prenolepis_albimaculata
Paratrechina_hystrix
Pseudolasius_australis
Myrmecia_pyriformis
Nothomyrmecia_macrops
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Aenictus_eugenii
Aenictus_ceylonicus
Cerapachys_sexspinus
Leptanilloides_mckennae
Leptanilloides_nomada
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Simopone_marleyi
Cerapachys_larvatus
Cerapachys_augustae
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili
Turneria_bidentata
Philidris_cordatus
Anonychomyrma_gilberti
Linepithema_humile
Papyrius_nitidus
Azteca_ovaticeps
Dorymyrmex_bicolor
Forelius_pruinosus
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
Dolichoderus_scabridus
Liometopum_occidentale
Liometopum_apiculatum
Tapinoma_sessile
Technomyrmex_MAD05
Technomyrmex_difficilis
Aneuretus_simoni
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_rufonigra
Tetraponera_punctulata
Plectroctena_ugandensis
Loboponera_politula
Psalidomyrmex_procerus
Centromyrmex_sellaris
Hypoponera_opacior
Hypoponera_sakalava
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Odontoponera_transversa
Odontomachus_coquereli
Pachycondyla_sikorae
Leptogenys_diminuta
Anochetus_madagascarensis
Platythyrea_punctata
Platythyrea_mocquerysi
Proceratium_stictum
Proceratium_MAD08
Discothyrea_MAD07
Probolomyrmex_tani
Paraponera_clavata
Prionopelta_MAD01
Concoctio_concenta
Onychomyrmex_hedleyi
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Adetomyrma_MAD02
Apomyrma_stygia
Tatuidris_ECU01
Leptanilla_RSA01
Leptanilla_GRE01
Protanilla_JAP01

Fig. S1E.

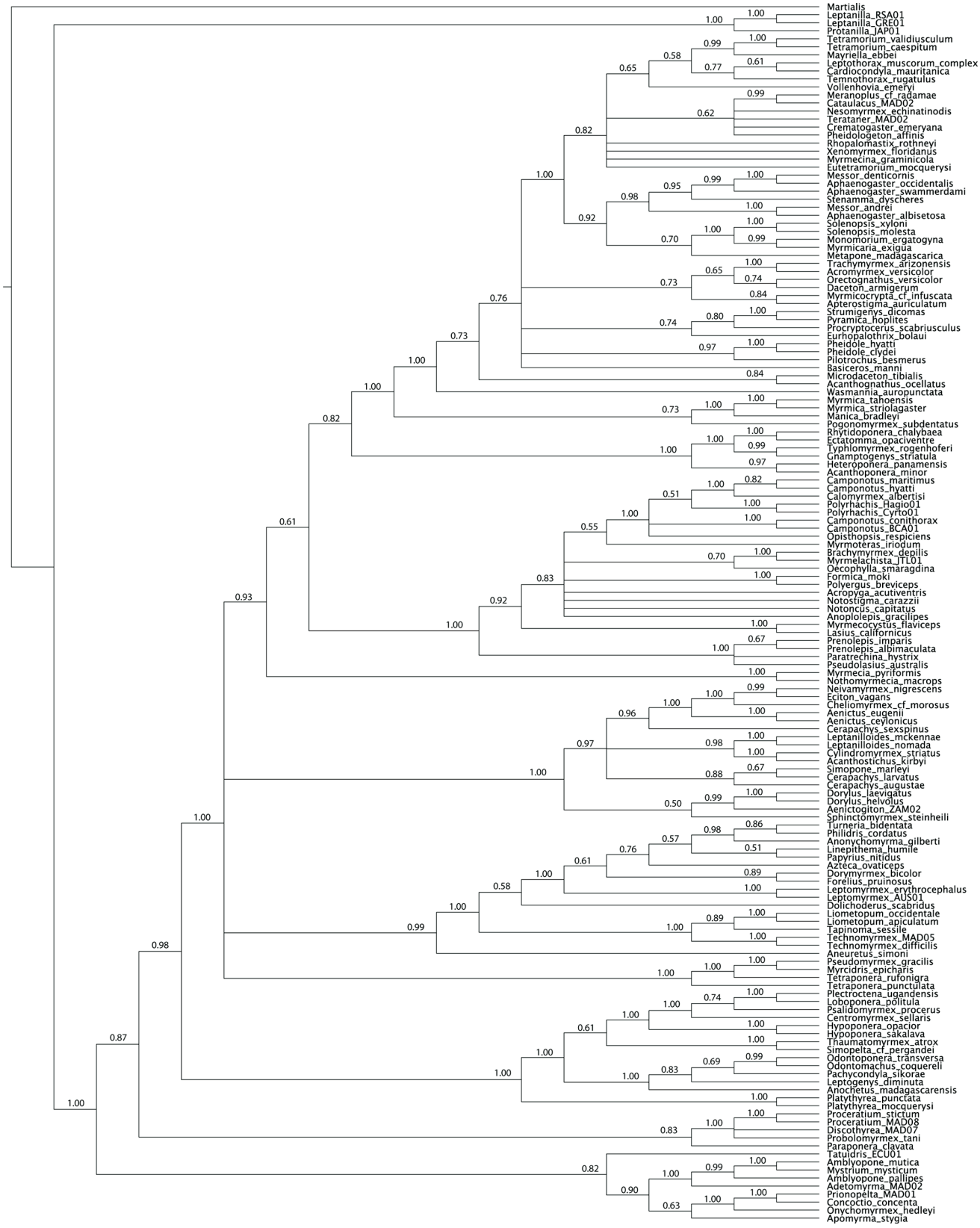
Martialis
Leptanilla_RSA01
Leptanilla_GRE01
Protanilla_JAP01
Tetramorium_validiusculum
Tetramorium_caespitum
Mayriella_ebbei
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Temnothorax_rugatulus
Vollenhovia_emeryi
Meranoplus_cf_radamae
Cataulacus_MAD02
Nesomyrmex_echinatinodis
Terataner_MAD02
Crematogaster_emeryana
Pheidologeton_affinis
Rhopalomastix_rothneyi
Xenomyrmex_floridanus
Myrmecina_graminicola
Eutetramorium_mocquerysi
Messor_denticornis
Aphaenogaster_occidentalis
Aphaenogaster_swammerdami
Stenamma_dyscheres
Messor_andrei
Aphaenogaster_albisetosa
Solenopsis_xyloni
Solenopsis_molesta
Monomorium_ergatogyna
Myrmicaria_exigua
Metapone_madagascarica
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Orectognathus_versicolor
Daceton_armigerum
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Strumigenys_dicomas
Pyramica_hoplites
Procryptocerus_scabriusculus
Eurhopalothrix_bolaui
Pheidole_hyatti
Pheidole_clydei
Pilotrochus_besmerus
Basiceros_manni
Microdaceton_tibialis
Acanthognathus_ocellatus
Wasmannia_auropunctata
Myrmica_tahoensis
Myrmica_striolagaster
Manica_bradleyi
Pogonomyrmex_subdentatus
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Heteroponera_panamensis
Acanthoponera_minor
Camponotus_maritimus
Camponotus_hyatti
Calomyrmex_albertisi
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Camponotus_conithorax
Camponotus_BCA01
Opisthopsis_respiciens
Myrmoteras_iridium
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Formica_moki
Polyergus_breviceps
Acropyga_acutiventris
Notostigma_carazzii
Notoncus_capitatus
Anoplolepis_gracilipes
Myrmecocystus_flaviceps
Lasius_californicus
Prenolepis_imparis
Prenolepis_albimaculata
Paratrechina_hystrix
Pseudolasius_australis
Myrmecia_pyriformis
Nothomyrmecia_macrops
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Aenictus_eugenii
Aenictus_ceylonicus
Cerapachys_sexspinus
Leptanilloides_mckennae
Leptanilloides_nomada
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Simopone_marleyi
Cerapachys_larvatus
Cerapachys_augustae
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili
Turneria_bidentata
Philidris_cordatus
Anonychomyrma_gilberti
Linepithema_humile
Papyrius_nitidus
Azteca_ovaticeps
Dorymyrmex_bicolor
Forelius_pruinosus
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
Dolichoderus_scabridus
Liometopum_occidentale
Liometopum_apiculatum
Tapinoma_sessile
Technomyrmex_MAD05
Technomyrmex_difficilis
Aneuretus_simoni
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_rufonigra
Tetraponera_punctulata
Plectroctena_ugandensis
Loboponera_politula
Psalidomyrmex_procerus
Centromyrmex_sellaris
Hypoponera_opacior
Hypoponera_sakalava
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Odontoponera_transversa
Odontomachus_coquereli
Pachycondyla_sikorae
Leptogenys_diminuta
Anochetus_madagascarensis
Platythyrea_punctata
Platythyrea_mocquerysi
Proceratium_stictum
Proceratium_MAD08
Discothyrea_MAD07
Probolomyrmex_tani
Paraponera_clavata
Tatuidris_ECU01
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Adetomyrma_MAD02
Prionopelta_MAD01
Concoctio_concenta
Onychomyrmex_hedleyi
Apomyrma_stygia

Fig. S1F.

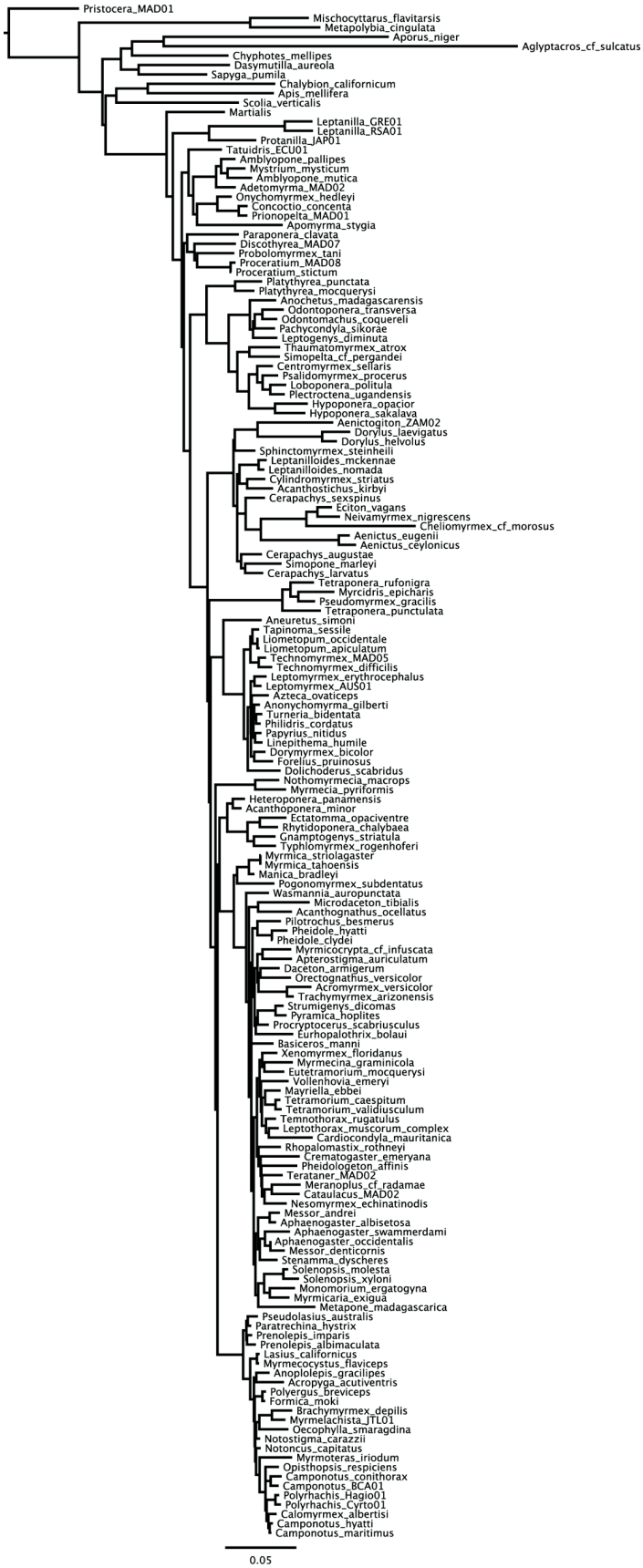

Fig. S2. Results from ML analyses. (*A*) Best tree from analysis of the full data set, (*B*) with Leptanillinae excluded from analysis, (*C*) with Leptanillinae and outgroups excluded, (*D*) with *Martialis* excluded, (*E*) with *Martialis* and outgroups excluded, (*F*) with only outgroups excluded; (*G*) Majority-rule consensus tree from ML bootstrap analysis of the complete data set.

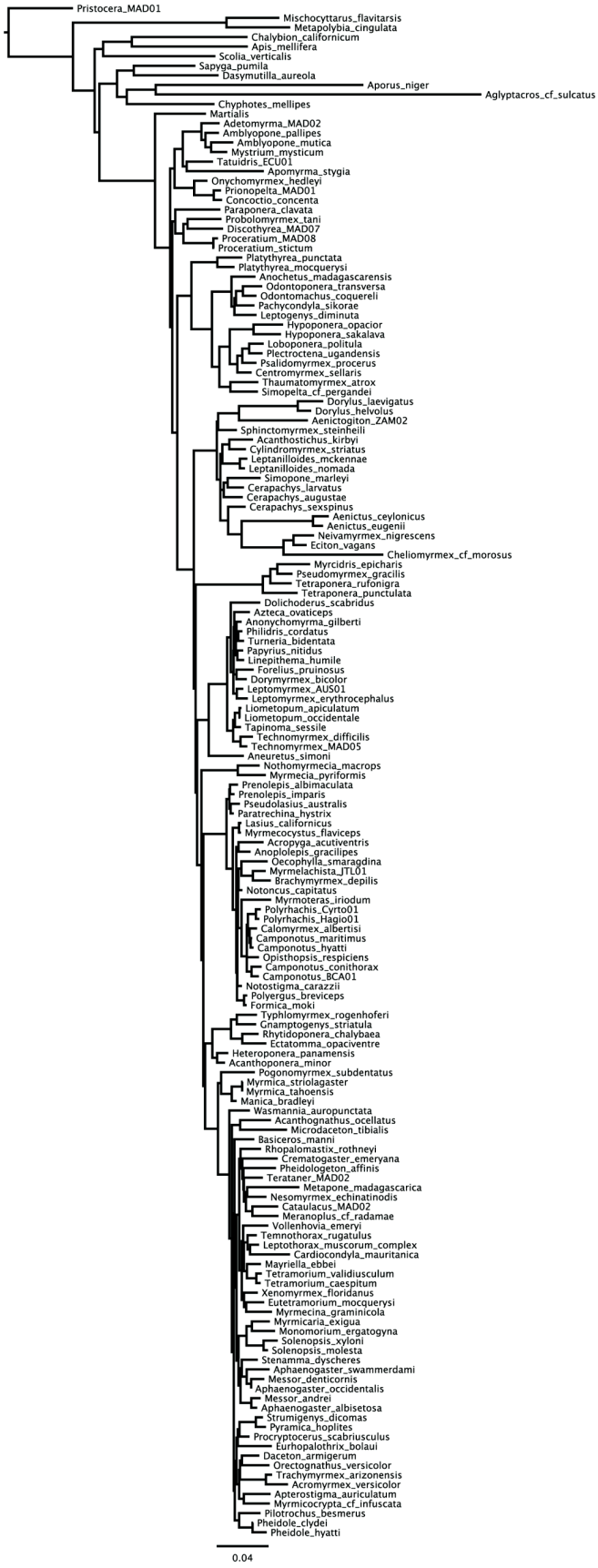
Pristocera_MAD01
Mischocyttarus_flavitarsis
Metapolybia_cingulata
Chalybion_californicum
Apis_mellifera
Scolia_verticalis
Sapyga_pumila
Dasymutilla_aureola
Aporus_niger
Aglyptacros_cf_sulcatus
Chyphotes_mellipes
Martialis
Adetomyrma_MAD02
Amblyopone_pallipes
Amblyopone_mutica
Mystrium_mysticum
Tatuidris_ECU01
Apomyrma_stygia
Onychomyrmex_hedleyi
Prionopelta_MAD01
Concoctio_concenta
Paraponera_clavata
Probolomyrmex_tani
Discothyrea_MAD07
Proceratium_MAD08
Proceratium_stictum
Platythyrea_punctata
Platythyrea_mocquerysi
Anochetus_madagascarensis
Odontoponera_transversa
Odontomachus_coquereli
Pachycondyla_sikorae
Leptogenys_diminuta
Hypoponera_opacior
Hypoponera_sakalava
Loboponera_politula
Plectroctena_ugandensis
Psalidomyrmex_procerus
Centromyrmex_sellaris
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili
Acanthostichus_kirbyi
Cylindromyrmex_striatus
Leptanilloides_mckennae
Leptanilloides_nomada
Simopone_marleyi
Cerapachys_larvatus
Cerapachys_augustae
Cerapachys_sexspinus
Aenictus_ceylonicus
Aenictus_eugenii
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Myrcidris_epicharis
Pseudomyrmex_gracilis
Tetraponera_rufonigra
Tetraponera_punctulata
Dolichoderus_scabridus
Azteca_ovaticeps
Anonychomyrma_gilberti
Philidris_cordatus
Turneria_bidentata
Papyrius_nitidus
Linepithema_humile
Forelius_pruinosus
Dorymyrmex_bicolor
Leptomyrmex_AUS01
Leptomyrmex_erythrocephalus
Liometopum_apiculatum
Liometopum_occidentale
Tapinoma_sessile
Technomyrmex_difficilis
Technomyrmex_MAD05
Aneuretus_simoni
Nothomyrmecia_macrops
Myrmecia_pyriformis
Prenolepis_albimaculata
Prenolepis_imparis
Pseudolasius_australis
Paratrechina_hystrix
Lasius_californicus
Myrmecocystus_flaviceps
Acropyga_acutiventris
Anoplolepis_gracilipes
Oecophylla_smaragdina
Myrmelachista_JTL01
Brachymyrmex_depilis
Notoncus_capitatus
Myrmoteras_iriodum
Polyrhachis_Cyrto01
Polyrhachis_Hagio01
Calomyrmex_albertisi
Camponotus_maritimus
Camponotus_hyatti
Opisthopsis_respiciens
Camponotus_conithorax
Camponotus_BCA01
Notostigma_carazzii
Polyergus_breviceps
Formica_moki
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Heteroponera_panamensis
Acanthoponera_minor
Pogonomyrmex_subdentatus
Myrmica_striolagaster
Myrmica_tahoensis
Manica_bradleyi
Wasmannia_auropunctata
Acanthognathus_ocellatus
Microdaceton_tibialis
Basiceros_manni
Rhopalomastix_rothneyi
Crematogaster_emeryana
Pheidologeton_affinis
Terataner_MAD02
Metapone_madagascarica
Nesomyrmex_echinatinodis
Cataulacus_MAD02
Meranoplus_cf_radamae
Vollenhovia_emeryi
Temnothorax_rugatulus
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Mayriella_ebbei
Tetramorium_validiusculum
Tetramorium_caespitum
Xenomyrmex_floridanus
Eutetramorium_mocquerysi
Myrmecina_graminicola
Myrmicaria_exigua
Monomorium_ergatogyna
Solenopsis_xyloni
Solenopsis_molesta
Stenamma_dyscheres
Aphaenogaster_swammerdami
Messor_denticornis
Aphaenogaster_occidentalis
Messor_andrei
Aphaenogaster_albisetosa
Strumigenys_dicomas
Pyramica_hoplites
Procryptocerus_scabriusculus
Eurhopalothrix_bolaui
Daceton_armigerum
Orectognathus_versicolor
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Apterostigma_auriculatum
Myrmicocrypta_cf_infuscata
Pilotrochus_besmerus
Pheidole_clydei
Pheidole_hyatti
0.04

Fig. S2B.

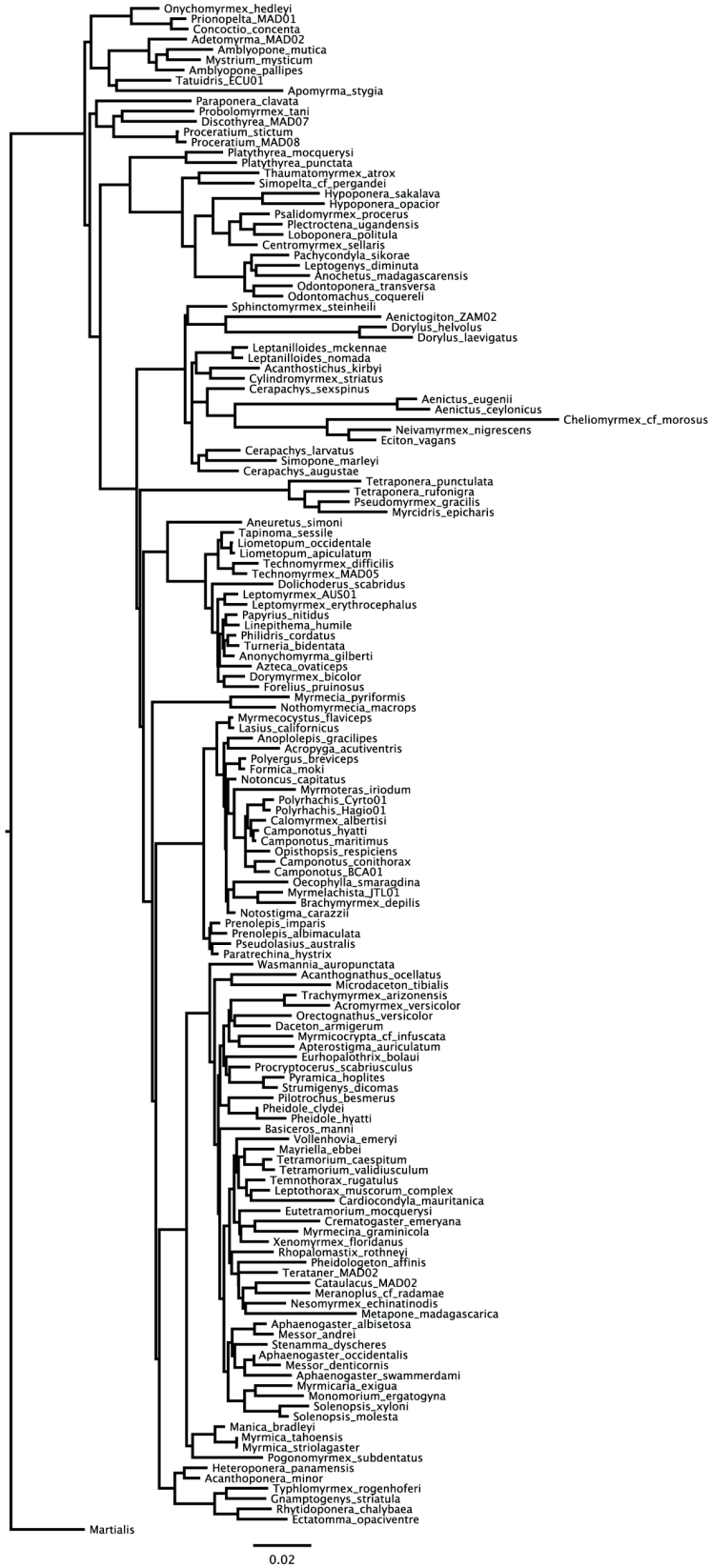
Onychomyrmex_hedleyi
Prionopelta_MAD01
Concoctio_concenta
Adetomyrma_MAD02
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Tatuidris_ECU01
Apomyrma_stygia
Paraponera_clavata
Probolomyrmex_tani
Discothyrea_MAD07
Proceratium_stictum
Proceratium_MAD08
Platythyrea_mocquerysi
Platythyrea_punctata
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Hypoponera_sakalava
Hypoponera_opacior
Psalidomyrmex_procerus
Plectroctena_ugandensis
Loboponera_politula
Centromyrmex_sellaris
Pachycondyla_sikorae
Leptogenys_diminuta
Anochetus_madagascarensis
Odontoponera_transversa
Odontomachus_coquereli
Sphinctomyrmex_steinheili
Aenictogiton_ZAM02
Dorylus_helvolus
Dorylus_laevigatus
Leptanilloides_mckennae
Leptanilloides_nomada
Acanthostichus_kirbyi
Cylindromyrmex_striatus
Cerapachys_sexspinus
Aenictus_eugenii
Aenictus_ceylonicus
Cheliomyrmex_cf_morosus
Neivamyrmex_nigrescens
Eciton_vagans
Cerapachys_larvatus
Simopone_marleyi
Cerapachys_augustae
Tetraponera_punctulata
Tetraponera_rufonigra
Pseudomyrmex_gracilis
Myrcidris_epicharis
Aneuretus_simoni
Tapinoma_sessile
Liometopum_occidentale
Liometopum_apiculatum
Technomyrmex_difficilis
Technomyrmex_MAD05
Dolichoderus_scabridus
Leptomyrmex_AUS01
Leptomyrmex_erythrocephalus
Papyrius_nitidus
Linepithema_humile
Philidris_cordatus
Turneria_bidentata
Anonychomyrma_gilberti
Azteca_ovaticeps
Dorymyrmex_bicolor
Forelius_pruinosus
Myrmecia_pyriformis
Nothomyrmecia_macrops
Myrmecocystus_flaviceps
Lasius_californicus
Anoplolepis_gracilipes
Acropyga_acutiventris
Polyergus_breviceps
Formica_moki
Notoncus_capitatus
Myrmoteras_iriodum
Polyrhachis_Cyrto01
Polyrhachis_Hagio01
Calomyrmex_albertisi
Camponotus_hyatti
Camponotus_maritimus
Opisthopsis_respiciens
Camponotus_conithorax
Camponotus_BCA01
Oecophylla_smaragdina
Myrmelachista_JTL01
Brachymyrmex_depilis
Notostigma_carazzii
Prenolepis_imparis
Prenolepis_albimaculata
Pseudolasius_australis
Paratrechina_hystrix
Wasmannia_auropunctata
Acanthognathus_ocellatus
Microdaceton_tibialis
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Orectognathus_versicolor
Daceton_armigerum
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Eurhopalothrix_bolaui
Procryptocerus_scabriusculus
Pyramica_hoplites
Strumigenys_dicomas
Pilotrochus_besmerus
Pheidole_clydei
Pheidole_hyatti
Basiceros_manni
Vollenhovia_emeryi
Mayriella_ebbei
Tetramorium_caespitum
Tetramorium_validiusculum
Temnothorax_rugatulus
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Eutetramorium_mocquerysi
Crematogaster_emeryana
Myrmecina_graminicola
Xenomyrmex_floridanus
Rhopalomastix_rothneyi
Pheidologeton_affinis
Terataner_MAD02
Cataulacus_MAD02
Meranoplus_cf_radamae
Nesomyrmex_echinatinodis
Metapone_madagascarica
Aphaenogaster_albisetosa
Messor_andrei
Stenamma_dyscheres
Aphaenogaster_occidentalis
Messor_denticornis
Aphaenogaster_swammerdami
Myrmicaria_exigua
Monomorium_ergatogyna
Solenopsis_xyloni
Solenopsis_molesta
Manica_bradleyi
Myrmica_tahoensis
Myrmica_striolagaster
Pogonomyrmex_subdentatus
Heteroponera_panamensis
Acanthoponera_minor
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Martialis
0.02

Fig. S2C.

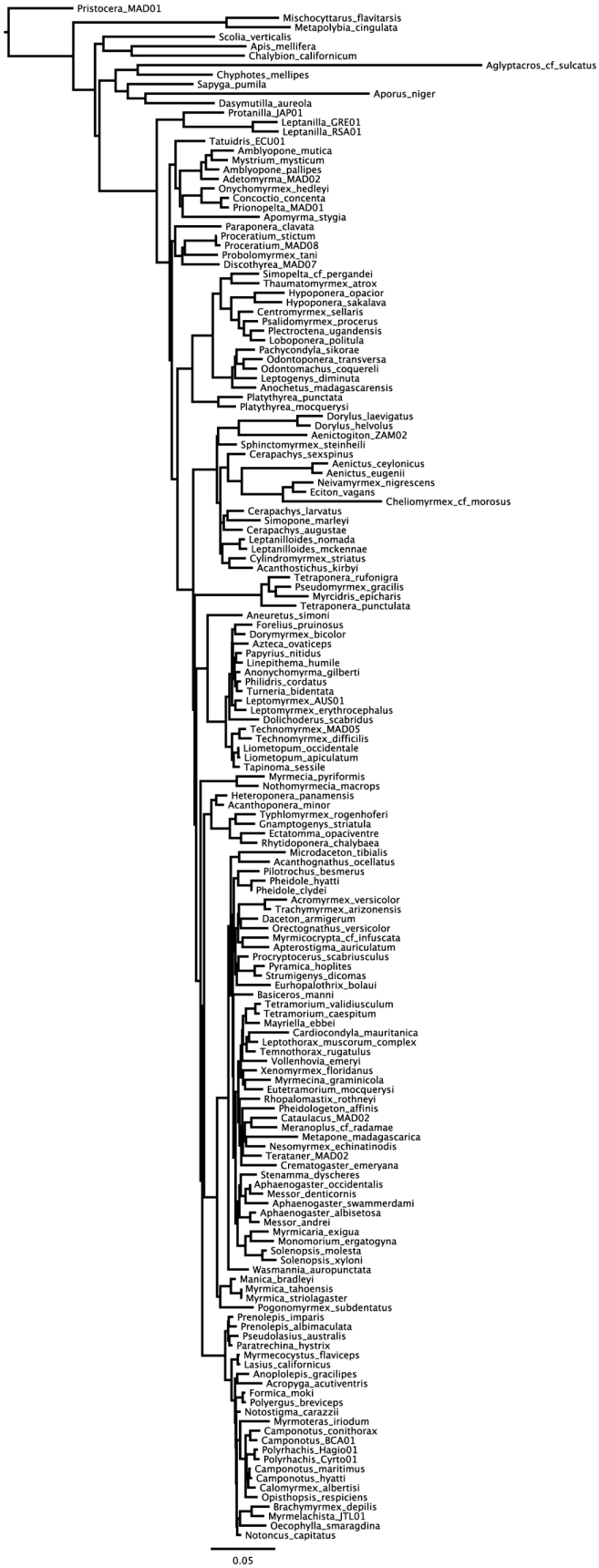
Pristocera_MAD01
Mischocyttarus_flavitarsis
Metapolybia_cingulata
Scolia_verticalis
Apis_mellifera
Chalybion_californicum
Aglyptacros_cf_sulcatus
Chyphotes_mellipes
Sapyga_pumila
Aporus_niger
Dasymutilla_aureola
Protanilla_JAP01
Leptanilla_GRE01
Leptanilla_RSA01
Tatuidris_ECU01
Amblyopone_mutica
Mystrium_mysticum
Amblyopone_pallipes
Adetomyrma_MAD02
Onychomyrmex_hedleyi
Concoctio_concenta
Prionopelta_MAD01
Apomyrma_stygia
Paraponera_clavata
Proceratium_stictum
Proceratium_MAD08
Probolomyrmex_tani
Discothyrea_MAD07
Simopelta_cf_pergandei
Thaumatomyrmex_atrox
Hypoponera_opacior
Hypoponera_sakalava
Centromyrmex_sellaris
Psalidomyrmex_procerus
Plectroctena_ugandensis
Loboponera_politula
Pachycondyla_sikorae
Odontoponera_transversa
Odontomachus_coquereli
Leptogenys_diminuta
Anochetus_madagascarensis
Platythyrea_punctata
Platythyrea_mocquerysi
Dorylus_laevigatus
Dorylus_helvolus
Aenictogiton_ZAM02
Sphinctomyrmex_steinheili
Cerapachys_sexspinus
Aenictus_ceylonicus
Aenictus_eugenii
Neivamyrmex_nigrescens
Eciton_vagans
Cheliomyrmex_cf_morosus
Cerapachys_larvatus
Simopone_marleyi
Cerapachys_augustae
Leptanilloides_nomada
Leptanilloides_mckennae
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Tetraponera_rufonigra
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_punctulata
Aneuretus_simoni
Forelius_pruinosus
Dorymyrmex_bicolor
Azteca_ovaticeps
Papyrius_nitidus
Linepithema_humile
Anonychomyrma_gilberti
Philidris_cordatus
Turneria_bidentata
Leptomyrmex_AUS01
Leptomyrmex_erythrocephalus
Dolichoderus_scabridus
Technomyrmex_MAD05
Technomyrmex_difficilis
Liometopum_occidentale
Liometopum_apiculatum
Tapinoma_sessile
Myrmecia_pyriformis
Nothomyrmecia_macrops
Heteroponera_panamensis
Acanthoponera_minor
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Ectatomma_opaciventre
Rhytidoponera_chalybaea
Microdaceton_tibialis
Acanthognathus_ocellatus
Pilotrochus_besmerus
Pheidole_hyatti
Pheidole_clydei
Acromyrmex_versicolor
Trachymyrmex_arizonensis
Daceton_armigerum
Orectognathus_versicolor
Myrmicocrypta_cf_infuscata
Apterostigma_auriculatum
Procryptocerus_scabriusculus
Pyramica_hoplites
Strumigenys_dicomas
Eurhopalothrix_bolaui
Basiceros_manni
Tetramorium_validiusculum
Tetramorium_caespitum
Mayriella_ebbei
Cardiocondyla_mauritanica
Leptothorax_muscorum_complex
Temnothorax_rugatulus
Vollenhovia_emeryi
Xenomyrmex_floridanus
Myrmecina_graminicola
Eutetramorium_mocquerysi
Rhopalomastix_rothneyi
Pheidologeton_affinis
Cataulacus_MAD02
Meranoplus_cf_radamae
Metapone_madagascarica
Nesomyrmex_echinatinodis
Terataner_MAD02
Crematogaster_emeryana
Stenamma_dyscheres
Aphaenogaster_occidentalis
Messor_denticornis
Aphaenogaster_swammerdami
Aphaenogaster_albisetosa
Messor_andrei
Myrmicaria_exigua
Monomorium_ergatogyna
Solenopsis_molesta
Solenopsis_xyloni
Wasmannia_auropunctata
Manica_bradleyi
Myrmica_tahoensis
Myrmica_striolagaster
Pogonomyrmex_subdentatus
Prenolepis_imparis
Prenolepis_albimaculata
Pseudolasius_australis
Paratrechina_hystrix
Myrmecocystus_flaviceps
Lasius_californicus
Anoplolepis_gracilipes
Acropyga_acutiventris
Formica_moki
Polyergus_breviceps
Notostigma_carazzii
Myrmoteras_iriodum
Camponotus_comithorax
Camponotus_BCA01
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Camponotus_maritimus
Camponotus_hyatti
Calomyrmex_albertisi
Opisthopsis_respiciens
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Notoncus_capitatus
0.05

Fig. S2D.

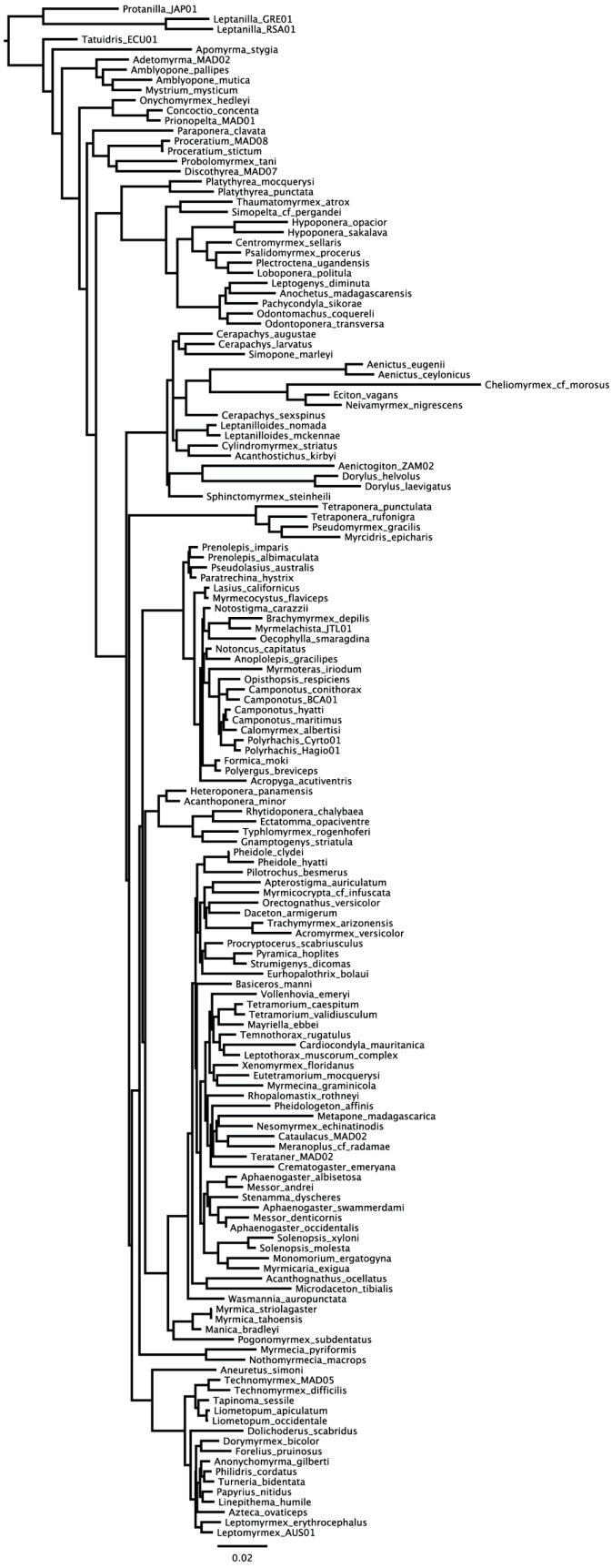
Protanilla_JAP01
Leptanilla_GRE01
Leptanilla_RSA01
Tatuidris_ECU01
Apomyrma_stygia
Adetomyrma_MAD02
Amblyopone_pallipes
Amblyopone_mutica
Mystrium_mysticum
Onychomyrmex_hedleyi
Concoctio_concenta
Prionopelta_MAD01
Paraponera_clavata
Proceratium_MAD08
Proceratium_stictum
Probolomyrmex_tani
Discothyrea_MAD07
Platythyrea_mocquerysi
Platythyrea_punctata
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Hypoponera_opacior
Hypoponera_sakalava
Centromyrmex_sellaris
Psalidomyrmex_procerus
Plectroctena_ugandensis
Loboponera_politula
Leptogenys_diminuta
Anochetus_madagascarensis
Pachycondyla_sikorae
Odontomachus_coquereli
Odontoponera_transversa
Cerapachys_augustae
Cerapachys_larvatus
Simopone_marleyi
Aenictus_eugenii
Aenictus_ceylonicus
Cheliomyrmex_cf_morosus
Eciton_vagans
Neivamyrmex_nigrescens
Cerapachys_sexspinus
Leptanilloides_nomada
Leptanilloides_mckennae
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Aenictogiton_ZAM02
Dorylus_helvolus
Dorylus_laevigatus
Sphinctomyrmex_steinheili
Tetraponera_punctulata
Tetraponera_rufonigra
Pseudomyrmex_gracilis
Myrcidris_epicharis
Prenolepis_imparis
Prenolepis_albimaculata
Pseudolasius_australis
Paratrechina_hystrix
Lasius_californicus
Myrmecocystus_flaviceps
Notostigma_carazzii
Brachymyrmex_depilis
Myrmelachista_JTL01
Oecophylla_smaragdina
Notoncus_capitatus
Anoplolepis_gracilipes
Myrmoteras_iriodum
Opisthopsis_respiciens
Camponotus_conithorax
Camponotus_BCA01
Camponotus_hyatti
Camponotus_maritimus
Calomyrmex_albertisi
Polyrhachis_Cyrto01
Polyrhachis_Hagio01
Formica_moki
Polyergus_breviceps
Acropyga_acutiventris
Heteroponera_panamensis
Acanthoponera_minor
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Pheidole_clydei
Pheidole_hyatti
Pilotrochus_besmerus
Apterostigma_auriculatum
Myrmicocrypta_cf_infuscata
Orectognathus_versicolor
Daceton_armigerum
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Procryptocerus_scabriusculus
Pyramica_hoplites
Strumigenys_dicomas
Eurhopalothrix_bolaui
Basiceros_manni
Vollenhovia_emeryi
Tetramorium_caespitum
Tetramorium_validiusculum
Mayriella_ebbei
Temnothorax_rugatulus
Cardiocondyla_mauritanica
Leptothorax_muscorum_complex
Xenomyrmex_floridanus
Eutetramorium_mocquerysi
Myrmecina_graminicola
Rhopalomastix_rothneyi
Pheidologeton_affinis
Metapone_madagascarica
Nesomyrmex_echinatinodis
Cataulacus_MAD02
Meranoplus_cf_radamae
Terataner_MAD02
Crematogaster_emeryana
Aphaenogaster_albisetosa
Messor_andrei
Stenamma_dyscheres
Aphaenogaster_swammerdami
Messor_denticornis
Aphaenogaster_occidentalis
Solenopsis_xyloni
Solenopsis_molesta
Monomorium_ergatogyna
Myrmicaria_exigua
Acanthognathus_ocellatus
Microdaceton_tibialis
Wasmannia_auropunctata
Myrmica_striolagaster
Myrmica_tahoensis
Manica_bradleyi
Pogonomyrmex_subdentatus
Myrmecia_pyriformis
Nothomyrmecia_macrops
Aneuretus_simoni
Technomyrmex_MAD05
Technomyrmex_difficilis
Tapinoma_sessile
Liometopum_apiculatum
Liometopum_occidentale
Dolichoderus_scabridus
Dorymyrmex_bicolor
Forelius_pruinosus
Anonychomyrma_gilberti
Philidris_cordatus
Turneria_bidentata
Papyrius_nitidus
Linepithema_humile
Azteca_ovaticeps
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
0.02

Fig. S2E.


Martialis
Leptanilla_RSA01
Leptanilla_GRE01
Protanilla_JAP01
Tatuidris_ECU01
Prionopelta_MAD01
Concoctio_concenta
Onychomyrmex_hedleyi
Apomyrma_stygia
Adetomyrma_MAD02
Amblyopone_pallipes
Amblyopone_mutica
Mystrium_mysticum
Paraponera_clavata
Proceratium_MAD08
Proceratium_stictum
Discothyrea_MAD07
Probolomyrmex_tani
Thaumatomyrmex_atrox
Simopelta_cf_pergandei
Centromyrmex_sellaris
Psalidomyrmex_procerus
Plectroctena_ugandensis
Loboponera_politula
Hypoponera_opacior
Hypoponera_sakalava
Odontoponera_transversa
Odontomachus_coquereli
Anochetus_madagascarensis
Leptogenys_diminuta
Pachycondyla_sikorae
Platythyrea_punctata
Platythyrea_mocquerysi
Cerapachys_sexspinus
Aenictus_eugenii
Aenictus_ceylonicus
Cheliomyrmex_cf_morosus
Eciton_vagans
Neivamyrmex_nigrescens
Acanthostichus_kirbyi
Cylindromyrmex_striatus
Leptanilloides_mckennae
Leptanilloides_nomada
Cerapachys_augustae
Simopone_marleyi
Cerapachys_larvatus
Sphinctomyrmex_steinheili
Aenictogiton_ZAM02
Dorylus_helvolus
Dorylus_laevigatus
Pseudomyrmex_gracilis
Myrcidris_epicharis
Tetraponera_rufonigra
Tetraponera_punctulata
Liometopum_apiculatum
Liometopum_occidentale
Tapinoma_sessile
Technomyrmex_difficilis
Technomyrmex_MAD05
Dolichoderus_scabridus
Leptomyrmex_erythrocephalus
Leptomyrmex_AUS01
Forelius_pruinosus
Dorymyrmex_bicolor
Azteca_ovaticeps
Linepithema_humile
Papyrius_nitidus
Anonychomyrma_gilberti
Philidris_cordatus
Turneria_bidentata
Aneuretus_simoni
Myrmecia_pyriformis
Nothomyrmecia_macrops
Prenolepis_imparis
Prenolepis_albimaculata
Pseudolasius_australis
Paratrechina_hystrix
Acropyga_acutiventris
Myrmoteras_iriodum
Opisthopsis_respiciens
Camponotus_conithorax
Camponotus_BCA01
Calomyrmex_albertisi
Camponotus_hyatti
Camponotus_maritimus
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Anoplolepis_gracilipes
Notoncus_capitatus
Notostigma_carazzii
Oecophylla_smaragdina
Brachymyrmex_depilis
Myrmelachista_JTL01
Polyergus_breviceps
Formica_moki
Lasius_californicus
Myrmecocystus_flaviceps
Acanthoponera_minor
Heteroponera_panamensis
Gnamptogenys_striatula
Typhlomyrmex_rogenhoferi
Rhytidoponera_chalybaea
Ectatomma_opaciventre
Pogonomyrmex_subdentatus
Manica_bradleyi
Myrmica_tahoensis
Myrmica_striolagaster
Wasmannia_auropunctata
Microdaceton_tibialis
Acanthognathus_ocellatus
Solenopsis_molesta
Solenopsis_xyloni
Monomorium_ergatogyna
Myrmicaria_exigua
Stenamma_dyscheres
Aphaenogaster_swammerdami
Messor_denticornis
Aphaenogaster_occidentalis
Messor_andrei
Aphaenogaster_albisetosa
Eutetramorium_mocquerysi
Myrmecina_graminicola
Xenomyrmex_floridanus
Mayriella_ebbei
Tetramorium_caespitum
Tetramorium_validiusculum
Temnothorax_rugatulus
Leptothorax_muscorum_complex
Cardiocondyla_mauritanica
Vollenhovia_emeryi
Crematogaster_emeryana
Cataulacus_MAD02
Meranoplus_cf_radamae
Metapone_madagascarica
Nesomyrmex_echinatinodis
Terataner_MAD02
Pheidologeton_affinis
Rhopalomastix_rothneyi
Basiceros_manni
Pheidole_hyatti
Pheidole_clydei
Pilotrochus_besmerus
Orectognathus_versicolor
Daceton_armigerum
Trachymyrmex_arizonensis
Acromyrmex_versicolor
Apterostigma_auriculatum
Myrmicocrypta_cf_infuscata
Eurhopalothrix_bolaui
Procryptocerus_scabriusculus
Pyramica_hoplites
Strumigenys_dicomas
0.02

Fig. S2F.

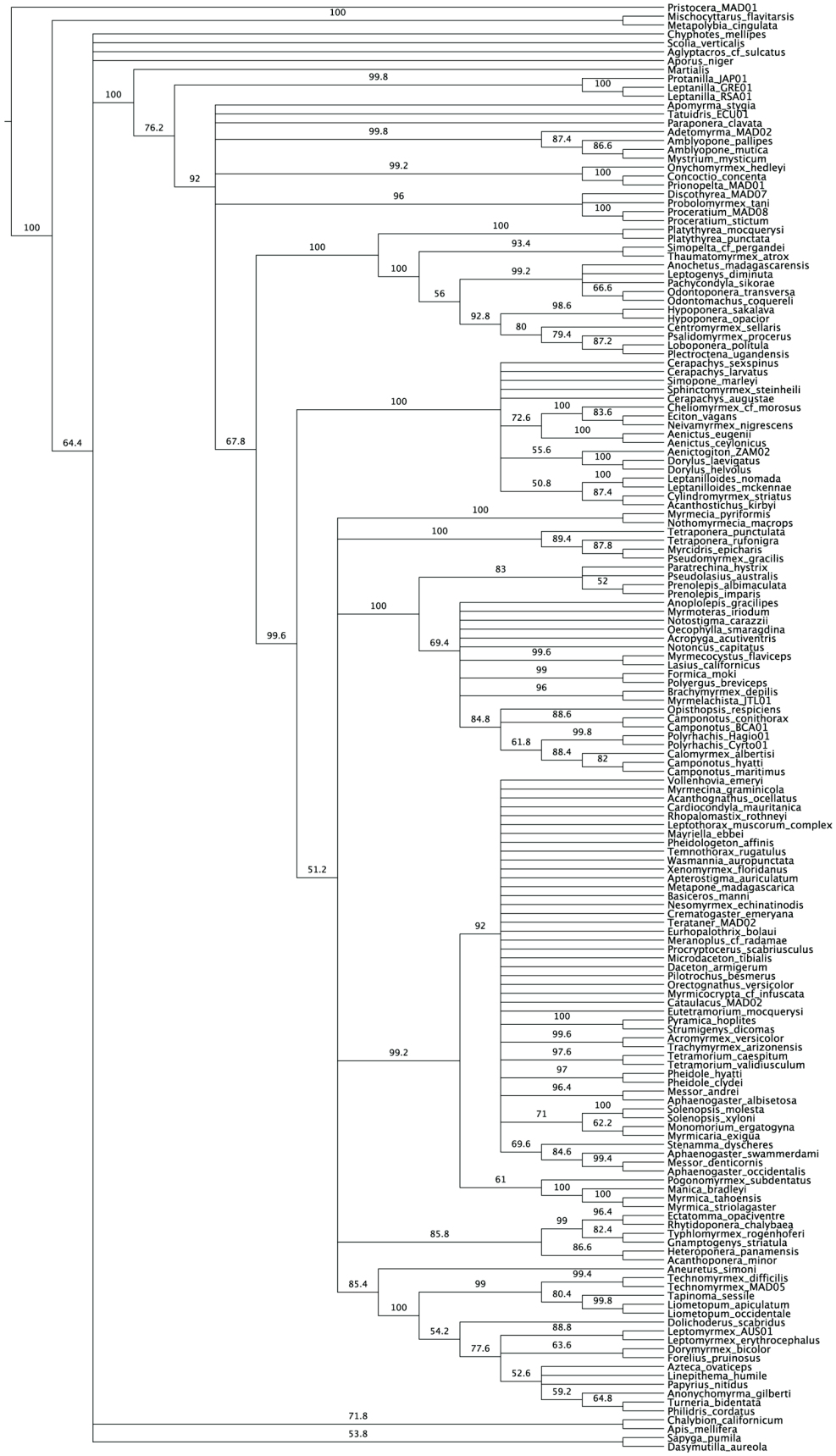
Pristocera_MAD01
Mischocyttarus_flavitarsis
Metapolybia_cingulata
Chyphotes_mellipes
Scolia_verticalis
Aglyptacros_cf_sulcatus
Aporus_niger
Martialis
Protanilla_JAP01
Leptanilla_GRE01
Leptanilla_RSA01
Apomyrma_stygia
Tatuidris_ECU01
Paraponera_clavata
Adetomyrma_MAD02
Amblyopone_pallipes
Amblyopone_mutica
Mystrium_mysticum
Onychomyrmex_hedleyi
Concoctio_concenta
Prionopelta_MAD01
Discothyrea_MAD07
Probolomyrmex_tani
Proceratium_MAD08
Proceratium_stictum
Platythyrea_mocquerysi
Platythyrea_punctata
Simopelta_cf_pergandei
Thaumatomyrmex_atrox
Anochetus_madagascarensis
Leptogenys_diminuta
Pachycondyla_sikorae
Odontoponera_transversa
Odontomachus_coquereli
Hypoponera_sakalava
Hypoponera_opacior
Centromyrmex_sellaris
Psalidomyrmex_procerus
Loboponera_politula
Plectroctena_ugandensis
Cerapachys_sexspinus
Cerapachys_larvatus
Simopone_marleyi
Sphinctomyrmex_steinheili
Cerapachys_augustae
Cheliomyrmex_cf_morosus
Eciton_vagans
Neivamyrmex_nigrescens
Aenictus_eugenii
Aenictus_ceylonicus
Aenictogiton_ZAM02
Dorylus_laevigatus
Dorylus_helvolus
Leptanilloides_nomada
Leptanilloides_mckennae
Cylindromyrmex_striatus
Acanthostichus_kirbyi
Myrmecia_pyriformis
Nothomyrmecia_macrops
Tetraponera_punctulata
Tetraponera_rufonigra
Myrcidris_epicharis
Pseudomyrmex_gracilis
Paratrechina_hystrix
Pseudolasius_australis
Prenolepis_albimaculata
Prenolepis_imparis
Anoplolepis_gracilipes
Myrmoteras_iriodum
Notostigma_carazzii
Oecophylla_smaragdina
Acropyga_acutiventris
Notoncus_capitatus
Myrmecocystus_flaviceps
Lasius_californicus
Formica_moki
Polyergus_breviceps
Brachymyrmex_depilis
Myrmelachista_JTL01
Opisthopsis_respiciens
Camponotus_conithorax
Camponotus_BCA01
Polyrhachis_Hagio01
Polyrhachis_Cyrto01
Calomyrmex_albertisi
Camponotus_hyatti
Camponotus_maritimus
Vollenhovia_emeryi
Myrmecina_graminicola
Acanthognathus_ocellatus
Cardiocondyla_mauritanica
Rhopalomastix_rothneyi
Leptothorax_muscorum_complex
Mayriella_ebbei
Pheidologeton_affinis
Temnothorax_rugatulus
Wasmannia_auropunctata
Xenomyrmex_floridanus
Apterostigma_auriculatum
Metapone_madagascarica
Basiceros_manni
Nesomyrmex_echinatinodis
Crematogaster_emeryana
Teratanes_MAD02
Eurhopalothrix_bolaui
Meranoplus_cf_radamae
Procryptocerus_scabriusculus
Microdaceton_tibialis
Daceton_armigerum
Pilotrochus_besmerus
Orectognathus_versicolor
Myrmicocrypta_cf_infuscata
Cataulacus_MAD02
Eutetramorium_mocquerysi
Pyramica_hoplites
Strumigenys_dicomas
Acromyrmex_versicolor
Trachymyrmex_arizonensis
Tetramorium_caespitum
Tetramorium_validiusculum
Pheidole_hyatti
Pheidole_clydei
Messor_andrei
Aphaenogaster_albisetosa
Solenopsis_molesta
Solenopsis_xyloni
Monomorium_ergatogyna
Myrmicaria_exigua
Stenamma_dyscheres
Aphaenogaster_swammerdami
Messor_denticornis
Aphaenogaster_occidentalis
Pogonomyrmex_subdentatus
Manica_bradleyi
Myrmica_tahoensis
Myrmica_striolagaster
Ectatomma_opaciventre
Rhytidoponera_chalybaea
Typhlomyrmex_rogenhoferi
Gnamptogenys_striatula
Heteroponera_panamensis
Acanthoponera_minor
Aneuretus_simoni
Technomyrmex_difficilis
Technomyrmex_MAD05
Tapinoma_sessile
Liometopum_apiculatum
Liometopum_occidentale
Dolichoderus_scabridus
Leptomyrmex_AUS01
Leptomyrmex_erythrocephalus
Dorymyrmex_bicolor
Forelius_pruinosus
Azteca_ovaticeps
Linepithema_humile
Papyrius_nitidus
Anonychomyrma_gilberti
Turneria_bidentata
Philidris_cordatus
Chalybion_californicum
Apis_mellifera
Sapyga_pumila
Dasymutilla_aureola

Fig. S2G.

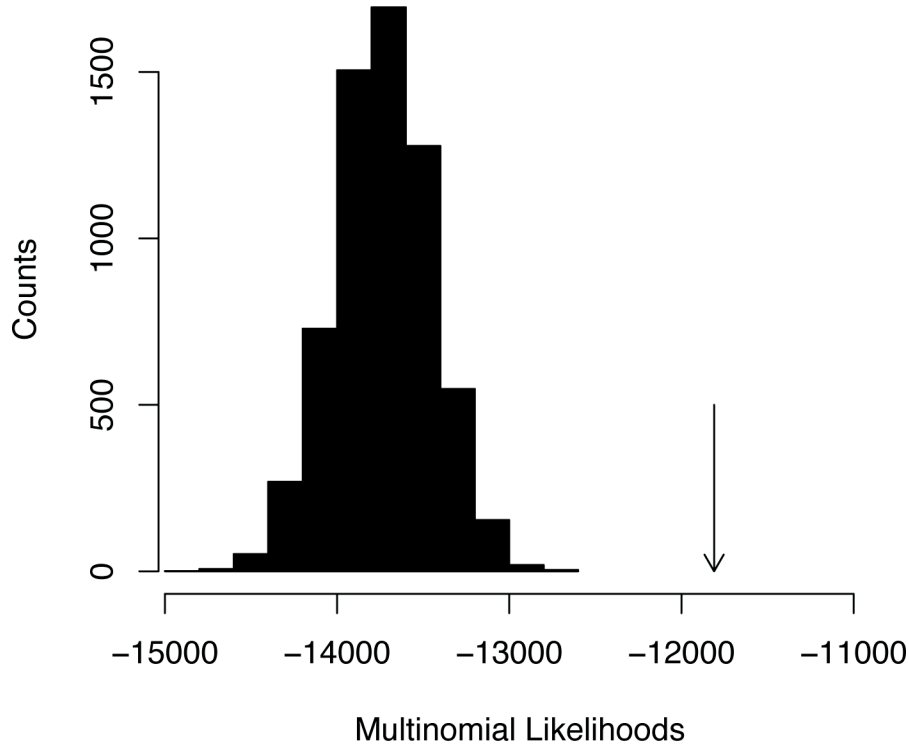

Fig. S3. Adequacy of the model of sequence evolution assessed with posterior predictive simulation. The null distribution was generated by subsampling (1%) output from the MCMC chains and using sampled parameter values to simulate data sets. The multinomial likelihoods of simulated data sets form the null distribution (histogram in black). The multinomial likelihood of the empirical data set is given by the arrow and clearly falls outside the null distribution ($P < 0.001$).

Table S1. Anatomical abbreviations and definitions of measurements

HL	Head length	Length of the head in full face view, excluding mandibles, measured in a straight line from the midpoint of the anterior clypeal margin to the midpoint of the posterior margin of the head, not including the projecting antennal sockets
HW	Head width	Maximum width of head
SL	Scape length	Maximum straight line length of the antennal scape excluding the basal constriction or neck close to the condylar bulb
FL	Funiculus length	Maximum length of antennal segments 2–12, excluding the scape
ML	Mandible length	Maximum mandible length, measured in a straight line from the mandibular insertion into the head capsule to the distal end of the mandible
WL	Weber's length	Diagonal length of the mesosoma in profile from the foremost point of the pronotum excluding cervical shield to the posterior base of the metapleuron
PW	Pronotum width	Maximum width of pronotum, measured in dorsal view
PEW	Petiolus width	Maximum width of petiolus, measured in dorsal view
PEL	Petiolus length	Maximum length of petiolus, measured in lateral view
PPW	Postpetiolus width	Maximum width of postpetiolus, measured in dorsal view
PPL	Postpetiolus length	Maximum length of postpetiolus, measured in lateral view
HFL	Hind femur length	Maximum length of metafemur
HTL	Hind tibia length	Maximum length of metatibia without the proximal part of the articulation which is received into the distal end of the hind femur
CI	Cephalic index	HW*100/HL
SI	Scape index	SL*100/HW
MI	Mandible index	ML*100/HL
DI	Dlussky index	SL*100/FL